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16. Abstract (Limit: 200 words)

This study examines alternatives to permit physician practices to opt out of the national Medicare Volume Performance Standards (MVPS) as legislated by the physician payment reforms of the Omnibus Budget Reconciliation Acts of 1989 and 1990 (P.L. 101-239 and 101-508). Separate MVPS could furnish incentives for cost savings, encourage efficient practices to grow, and help focus disincentives on less efficient providers. Medicare data for 1988-1990 for a sample of 122 medical practices in four states -- California, Pennsylvania, New Jersey, and Massachusetts were studied. Three separate categories of services were defined: (1) only services within a practice (2) all MVPS services (limited Part B) regardless of provider, and (3) all Medicare services (A & B) regardless of provider. Average annual reimbursements per unique patient seen for each provider were compared for 1989 and 1990 to assess stability over time. A bibliography and tables are included.

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SETTING MEDICARE VOLUME PERFORMANCE STANDARDS FOR LARGE PRIMARY CARE MEDICAL PRACTICES

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EXECUTIVE SUMMARY

This study examines options to permit physician practices to opt out of national Medicare Volume Performance Standards and be monitored separately. Doing so could furnish missing incentives for cost savings, encourage efficient practices to grow, and help to focus penalties or restrictions on less efficient providers.

Medicare data for a sample of 122 medical practices in four states were studied. Three separate categories of services were defined: 1) only services provided within the sample practice; 2) all services currently under MVPS, regardless of who provided them; and 3) all Medicare services. Average annual Reimbursements Per Unique Patient Seen for each provider were compared for 1989 and 1990. Sufficient stability over time would give credence to basing volume performance standards on prior Medicare experience.

The MVPS category of services had the lowest average change, at 11-percent; two-thirds of providers had single-digit percentage changes. The other categories led to higher average changes -- about 16 to 17 percent; almost one-half of providers had single-digit percentage changes. Adjusting performance standards for sex, reason for entitlement and health status might significantly improve their validity.

In addition, many multispecialty group practices were contacted and expressed interest in group-specific volume performance standards. Data for these groups will be used in the future to simulate standards under realistic circumstances.

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PART 1: VOLUME AND INTENSITY MEASURES AND STANDARDS

1.1 INTRODUCTION

Over the years, faulty incentive systems and advancements in clinical technologies have contributed to relentless increases in the volume and intensity of services provided to Medicare beneficiaries and others with third party coverage. Since physicians are the central decision-makers affecting utilization patterns, changing the way physicians practice is an implicit objective of system-wide and/or Medicare-specific reforms aimed at controlling expenditure growth. This report discusses an alternative to the current national Medicare Volume Performance Standards (MVPS) that may help to redress undesirable incentives created by the fee-for-service reimbursement system. This policy option would allow qualified physician practices to opt out of the national MVPS pool and be monitored separately for efficiency and quality. This approach could reward and encourage the growth of "best practices", and could co-exist with forceful regulatory policies intended to control price and volume increases by other providers.

The MVPS is intended to help control annual rates of increase in Medicare physician expenditure levels. Under MVPS, aggregate physician expenditure levels for a given year are compared to target levels that are based on projected rates of increase from the prior year. Resulting overruns can lead to smaller future increases in fee levels associated with relevant services. In this way, the Federal government holds physicians as a group partially accountable for excessive rates of increase in Medicare physician expenditures. However, the accountability relates to national volume performance, thereby creating very weak incentives for individual physicians or groups to practice efficiently. Blumenthal and Epstein (1992), articulating the sentiments of many, stated that "Against this tide of inflationary pressures, the Medicare Volume Performance Standard is a slim reed indeed."

Currently, most Part B services processed by Medicare carriers are included under MVPS. These are divided into two categories (surgical services and non-surgical services) for the purpose of computing national volume performance standards and determining fee updates. Consideration has been given to collapsing all services into a single pool so that relative prices among services, and therefore specialties, can be determined by the Medicare Fee Schedule and not differential performance according to surgery and medicine (Physician Payment Update, 1992). At the same time, researchers are exploring alternative ways of defining sets of services that could be subjected to separate volume performance standards. Partitioning services by state or by physician specialty, for example, may help to unmask systematic trends in rates of volume and intensity and thereby allow more equitable volume performance standards. However, setting standards by state or by specialty would not substantially enhance the economic incentives for individual physicians (Hadley, 1984; Marquis and Kominski, 1992).

It is important to build incentives into the reimbursement system that harmonize with efficient price setting in the overall theme of cost containment. Somehow physicians need to be interested in managing the aggregate volume and intensity of services received by their patients. Hence, consideration is being given to separate volume performance standards for service delivery organizations. Economic incentives for efficiency could be applied more directly to individual physicians if volume performance standards were defined only in terms of services provided to the beneficiaries they serve. One example would be services provided to patients at a given hospital. Physicians admitting to the hospital could be paid a fixed price for each discharge (Mitchell and Ellis, 1992), or could be monitored and penalized for excessive rates of volume and intensity (Welch and Miller, 1992). Presumably, hospitals have information systems that could yield appropriate feedback to individual physicians.

Other service delivery organizations that provide physician services could be given separate volume performance standards on a voluntary basis.

The focus of this report, which is part of an ongoing research effort, is on solo physicians, single specialty groups and multispecialty groups. Under suitable conditions, the services provided to patients of a volunteering physician organization could be "carved out" of the national pool of services and subjected to separate volume performance standards. For example, group practices can set performance standards for member physicians; tying a percentage of reimbursements to group performance can make individual physicians interested in their peer's behavior (Larkin, 1992).

For such an approach to be feasible, valid and reliable practice level volume performance standards will be needed. This study examines some potential measures of average volume and intensity of Medicare services for a sample of physician practices in the non-enrolled, fee-for-service sector. Average volume and intensity for each provider, measured in terms of reimbursements per Medicare patient seen for a year, are compared over consecutive years to explore the degree to which a provider's average volume rate remains stable.

An earlier report developed some preliminary models for measuring volume and intensity (VI) at the physician practice level (Wallack et al., 1991). For providers in the non-enrolled, fee-for-service sector a potential summary measure of volume and intensity used in that study was "reimbursements per unique patient seen." Conceptual models dealt with reimbursements to the practice, as well as broader ranges of services; however, the empirical analysis dealt solely with reimbursements to the provider. This report extends that empirical analysis to compare reimbursements to the provider with reimbursements for all MVPS services (regardless of provider), and reimbursements for all Medicare covered services to beneficiaries seen by the provider sometime during the year. These potential VI measures are analyzed in terms of their relative size, stability over time, and relationship to provider type and changes in patient mix.

The prior study also examined potential criteria for deciding what type of physician organization may volunteer for separate volume performance

standards (Wallack et al., 1991). During this study, many physician practice organizations have been contacted. Discussions have been held regarding potential interest in separate volume performance standards, and the implications of alternative definitions of VI. Part 2 of this report discusses progress in this area of the research.

The empirical analysis reported here uses data for a sample of Medicare Provider ID Numbers (i.e., billing numbers). Although convenient, the Provider ID Number is not an ideal unit of observation because individual physicians and group practices often bill under more than one number (Terrell et al., 1991). Starting with a five-percent national sample of billing numbers representing physician practices and suppliers, the study sample was limited to only relatively large medical providers having primary care specialties in selected carrier regions.[1] Beneficiary utilization experiences within the sampled providers and across all providers were analyzed to explore alternative VI definitions, as well as the potential reliability of VI targets.

The next section presents the empirical research questions in more detail. The third section describes the data sources, study files, and methods used in the empirical analysis. Results are presented in the fourth section, followed by conclusions.

1.2 RESEARCH QUESTIONS

This study examines the scope of services to be included in practice level VI measures, the effects of excluding high cost or low cost outlier influences from the VI measures, and factors associated with relative stability in average VI from one year to the next.

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[1]Specialties included are General Practice, Family Practice and Internal Medicine.

1.2.1 SERVICES TO INCLUDE IN THE VI MEASURE

What Medicare services might be included in the measure of volume and intensity:

a) Only services provided by the provider;

b) All MVPS services regardless of provider; or

c) All Medicare covered services regardless of provider?

An important issue for measuring volume and intensity has to do with which services to include in the VI measure. The national MVPS encompasses almost all services processed by Medicare carriers.[2] This study compares three major categories of service:

- Reimbursements to the particular practice during a year
- All MVPS services delivered to patients seen by the practice during the year
- All Medicare covered services delivered to patients seen by the practice during the year.

See Exhibit 1. Providers' perceptions of these alternatives are being explored as part of the overall research effort, and are discussed in Part 2 of this report.

The alternative service categories are compared here in terms of relative size, and in terms of relative stability from one year to the next. The rationale is that, if any of these measures can be expected to display reasonable stability over time, reimbursement rates in one year can serve as the basis for target rates for the next year. Of course, the beneficiaries are not locked-in to the provider seen; likewise providers can see a different

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[2]Exceptions are durable medical equipment, ambulance services, facility charges for ambulatory surgery centers, and some minor types of physician services. Facility charges under Part B for hospital outpatient departments, which are processed by Medicare "Part A" fiscal intermediaries, are also excluded.

set of patients in one year as compared to the next. In order to expect stability, there would need to be low patient turnover from year to year, a substantially similar patient mix in terms of health status and clinical need, and/or the ability to adjust targets to account for changes in health status.

Granted, providers "control" only the services they provide or prescribe. However, broader definitions of patients' utilization rates that include services by other providers may have advantages. Physicians can strongly influence use of other services through referrals and decisions to hospitalize, etc. In addition, volume rates that encompass services across all providers would more closely resemble per capita measures, and would therefore be subject to less fluctuation over time due to some factors such as changes in service delivery patterns by a single provider. However, adding more categories of services, such as hospital services, may introduce stochastic variations in utilization rates that contribute to instability in average VI rates over time.

1.2.2 REIMBURSEMENTS FOR HIGH COST OUTLIERS

How is the year-to-year stability in volume and intensity rates for providers changed by excluding high cost outlier reimbursements in the VI measure?

The proportion of high cost "outlier" cases seen by a provider may change from one year to the next. Such changes could significantly influence the provider's mean volume and intensity rates per beneficiary seen. This issue is explored by calculating volume and intensity for providers with and without reimbursements in excess of specified threshold values. Thresholds are examined for all three service categories (i.e., total Medicare, MVPS and within-provider). This type of adjustment is analogous to individual stop-

loss reinsurance provisions found in many payment systems that involve risk sharing.

Thresholds were defined in terms of the mean and standard deviation of reimbursements per unique patient seen within the practice. Removing unusually high reimbursement rates from the measure of average volume and intensity may result in greater stability in that measure over time. Interestingly, Wallack et al. (1991) found that truncating reimbursement amounts for individual beneficiaries reduced the mean coefficient of variation in within-provider reimbursements, but had little effect on the relative constancy over time of mean within-provider reimbursements per patient seen.

1.2.3 RELATIVELY LOW COST PATIENTS

How is the year-to-year stability in volume and intensity rates for providers changed by excluding patients with relatively low reimbursements in the VI measure?

Providers of services in the fee-for-service, non-enrolled sector are not granted authority to inhibit Medicare beneficiaries' access to other providers. Given beneficiaries' entitlement to "shop around," a patient may be seen by any given provider very few times, or for small amounts of service. In this study, volume and intensity measures are calculated with and without including patients with small absolute or relative reimbursement amounts to a given provider during a year (e.g., $50 or less; or one-tenth of the average for that provider). Again, thresholds are examined for all three service categories (i.e., total Medicare, MVPS and within-provider); in contrast to the high cost thresholds discussed earlier, the low cost thresholds are applied only to within-provider reimbursement levels.

Excluding such patients may be desirable in order to eliminate distortions in a provider's mean volume and intensity if the proportion of

patients with low within-provider reimbursements changes significantly from year to year. Such changes would be a source of stochastic variation in a provider's mean volume and intensity rates. Furthermore, providers would not be "accountable" at all for services delivered by other providers to such beneficiaries. Wallack et al. (1991) found that deleting individual low cost cases (less than $50) increased the stability across years in mean reimbursements per patient seen.

1.2.4 FACTORS ASSOCIATED WITH RELATIVE STABILITY

What factors are associated with the degree of year-to-year stability in volume and intensity rates for providers?

The data analysis reported here refers to a sample of providers (i.e., billing numbers) that is quite homogeneous relative to all physician practices billing Medicare. Specifically, the sample is oriented toward relatively large, primary care based medical providers located in five carrier regions. Excluded are solo providers and single specialty groups with specialties other than general practice, family practice or internal medicine. Excluded also are multispecialty groups (i.e, "clinics") that do not have these primary care specialties. All sample providers had at least $50,000 in Medicare reimbursements during one year (1989), before applying the subsequent sampling criteria.

Remaining differences in the sample are used to study systematic factors associated with differences in the stability of VI for these types of providers. Examining factors associated with relative stability can assist the development of eligibility criteria for providers participating in practice level VI standards. For example, a minimum number of beneficiaries may be required for there to be relative stability. Furthermore, some factors may be addressed through adjustments to the VI standard for a provider. For

example, a provider's mean VI rate could be calculated separately for patients classified according to relative health status. The provider's overall mean VI rate would reflect the distribution of patients according to those categories. The provider's target could be adjusted to reflect the actual distribution of patients in the period in which VI rates are being evaluated.

Among the factors explored in this study is the degree to which changes in health status, defined in terms of diagnostic cost groups (DCGs), are associated with changes in average VI rates from one year to the next. DCGs were developed as potential health status adjusters for capitation payment rates to HMOs with Medicare risk contracts (Ellis and Ash, 1988). Diagnostic data from hospital admissions in one year are used to classify beneficiaries according to expected total Medicare expenditures the next year.

Many other potential influences on stability also are explored. Aggregate changes in VI over time may differ by carrier region, by organization of practice (solo versus single and multispecialty groups), patient characteristics such as age, sex and the proportion who die during the year, and average utilization rates (e.g., proportion hospitalized and average number of hospital days).

1.3 DATA AND METHODS

1.3.1 DATA SOURCES

Several data sources were used to construct the study files. This section provides an overview of the data sources and how they were used. The 1989 Medicare Part B Annual Data (BMAD) III-Provider Summary file was used to draw a sample of physician Provider ID Numbers (i.e., billing numbers). Information about these providers was supplemented with data from the Medicare Physician Identification and Eligibility System (MPIES) file, which contains physician/practice data including the Medicare Unique Physician Identification

Number (UPIN) for each Medicare qualified physician in the nation as of Spring, 1991.

The same sample of physician providers was drawn from the 1988 and 1990 BMAD Provider Summary files.[3] For all patients seen by the sample providers during any of the three years 1988-1990, utilization and reimbursement data were obtained for all Medicare covered services from the Medicare Automated Data Retrieval System (MADRS) files for 1988, 1989 and 1990. The MADRS data were matched to the BMAD data to provide a comprehensive person-level view of utilization and reimbursements both to the BMAD sample provider and to all providers seen. Finally, selected data elements were obtained from the Medicare Enrollment Data Base in order to ensure that beneficiaries were eligible for Medicare services in the fee-for-service sector throughout the study period.

1.3.2 SAMPLE SELECTION

The goal of the sample selection process was to have approximately 100 large, primary care based medical practices, equally divided among multispecialty, single specialty and solo provider types. In brief, the study sample was selected in the following way:

- The BMAD file represents a national 5-percent sample of providers. Further consideration was given only to providers that were located in carrier regions in which the overall match rate between the Provider ID Numbers in the BMAD and the MPIES was greater than 90 percent. Matching BMAD and MPIES records is not straightforward, in that carriers frequently used different numbering systems for the two files. The provider sample was restricted to five carrier regions where match rates

[3] The BMAD Provider file contains data for a 5 percent sample of all providers (physicians and suppliers) that bill Medicare through Part B carriers. Providers are randomly selected by carriers for inclusion in the BMAD sample, but remain in the sample from one year to the next as long as they are active and continue to bill Medicare.

were sufficiently high: Northern California, Southern California, Pennsylvania, New Jersey and Massachusetts.

- A Provider ID Number in the BMAD file must successfully match to the MPIES file to be included in the study sample. This automatically eliminates non-physician suppliers of goods and services. A total of 4,193 physician practices in the BMAD file were matched.

- Total Medicare reimbursements to the provider in 1989 had to exceed $50,000. The distribution of reimbursements to physician practices is quite skewed, and this threshold defines a relatively small set of large practices.

- **Multispecialty groups.** The number of physicians and the specialty composition of all multispecialty groups meeting the above criteria were examined.[4] Generally, a multispecialty group was rejected from the sample if less than 20 percent or more than 80 percent of the physicians billing under that number had a primary care specialty (general practice, family practice or internal medicine); or if physicians with any other single specialty outnumbered the primary care physicians. The intent was to choose practices that appeared to have a primary care foundation and a potential internal referral network for specialists. Thirty-six multispecialty providers were selected in this step.

- **Solo and single specialty group practices.** Selection of single specialty groups and solo practices was guided by the multispecialty group sample. For each multispecialty group selected, efforts were made

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[4] This information was obtained by counting the number of individual physicians associated with a Provider ID Number in the MPIES file, and observing the primary specialty listed for each. For a physician listed in the practice as having only a "group practice" specialty, records for that physician in other practice settings were examined; and the first record for that physician with a valid specialty was used to designate that physician's specialty in the sample practice.

to select a single specialty and a solo practice 1) from the same carrier region, 2) with the primary care specialty observed most often in the corresponding multispecialty group, 3) the most similar in terms of total Medicare reimbursements. Thus, these providers were roughly matched to the multispecialty groups so that comparisons by provider type would partially control for factors associated with carrier region, primary care specialty, and Medicare reimbursement levels.

- In all, a sample of 140 physician providers resulted from these steps. Over the three-year period 1988-1990, about 210,000 Medicare beneficiaries were seen by these providers. Of these, six providers were eliminated because they were not found in the 1990 BMAD sample, and 21 providers were not found in the 1988 file. Since the main objective of the analysis is to examine changes in VI rates over consecutive years, it was necessary that providers be included in both years involved in each analytical step. This report focuses on the 1989-1990 study sample.

- About 50,000 beneficiaries were deleted from the analysis who were entitled to Medicare because of End-Stage Renal Disease, either exclusively or in conjunction with other reasons for entitlement, or who were HMO members for Medicare covered services[5]. More providers were lost to the sample because there were no remaining beneficiaries with positive reimbursements in at least one of the observation years. The resulting sample consisted of about 120,000 beneficiaries.

[5]We did not have actual dates of enrollment, so we deleted beneficiaries who were ever HMO members while eligible for Medicare.

1.3.3 DEFINITIONS OF VOLUME AND INTENSITY

Average volume and intensity (VI) at the physician provider level are measured jointly as *Reimbursements Per Unique Patient Seen* (RPUPS). This measure is a ratio in which reimbursements for the relevant services comprise the numerator, and beneficiaries seeing the provider (and for which Medicare reimbursements to the provider are made) are counted in the denominator. Many variations on this definition are used in this study, stemming from differences in the scope of services included, and special handling of unusually high and low cost patients.

Scope of Services

Three categories of services are used to form alternative definitions of RPUPS. By themselves, these differences affect only the numerator of the RPUPS ratio; beneficiaries must be associated with Medicare reimbursements to the provider in order to be included in the denominator of the VI summary measure. This excludes beneficiaries seen by the provider who had not met their Part B deductible. The three alternative service categories are:

1) All services provided by the specific physician practice
2) All Medicare services included under MVPS, regardless of who provided them
3) All Medicare covered services

Given the nature of the provider sample, most services in the first category (within-provider) will be primary care, especially for the single specialty and solo providers. The multispecialty groups may have a wide range of services even in this category. In all likelihood, the second and third categories will include a wide range of services in the VI measures for all sample providers because they include services received by beneficiaries regardless of who provided them. MVPS services include all Part B bills processed by Medicare carriers for physicians and suppliers except for

ambulance services, durable medical equipment, facility charges for Ambulatory Surgical Centers, and certain types of physician services.[6] The category "all Medicare covered services" includes all Part A and all Part B services.

Medicare providers are defined here in terms of billing numbers. Many physicians may use a single billing number, while one physician or a group of physicians practicing together may use more than one billing number. Data limitations prevent us from fully understanding any actual relationship between providers that is not reflected in billing numbers. Thus, services billed under a given number are construed as "within-provider" and other services are presumed to be less subject to that provider's influence or control. Within-provider reimbursements were observed in the BMAD file, while reimbursements for all physician services were obtained from MADRS.[7]

Optional Removal of Low Cost Patients

Beneficiaries who had minimal use of a given provider may be removed from the VI measure on the grounds that the provider had no opportunity to manage these persons' medical services. Several ways of defining "low cost" are examined, all of which refer to Medicare reimbursement levels to the provider. Three are based on absolute reimbursement amounts: reimbursements to the provider equal to or less than $50, $100, and $200. Two other cut-offs are based on the mean and standard deviation of Medicare revenues per patient to the provider: 10 percent of the provider mean and 25 percent of the provider mean.

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[6] Omitted are physician services for services categorized as "other" (Personal communication with William London, Office of the Actuary, HCFA).

[7] Unfortunately, there were problems with data quality that surfaced when comparing BMAD to MADRS reimbursements at the beneficiary level. Specifically, for some categories of service some beneficiaries had higher reimbursements observed in BMAD than in MADRS. This suggests that the two files might reflect different points in the process of finalizing bills. Alternatively, missing bills in MADRS could be contributing to this problem. Reportedly, the 1989 MADRS file was only 95% complete, and the 1990 MADRS file was 90% complete at the time of our data acquisition (Summer, 1992).

Patients whose reimbursements to the provider are below the low cost thresholds are removed entirely from the relevant VI summary measure. That is, their reimbursements to the provider are not counted in the numerator, and they are not counted in the denominator.

Optional Removal of Excessive Reimbursements

Patients with very high reimbursements relative to all patients seen by the provider may have excessive influence on the value of RPUPS, whether based on reimbursements to the provider, all MVPS services, or all Medicare services. The potential contribution to the instability of RPUPS can be reduced by omitting reimbursements that far exceed the mean for the physician provider. Therefore, two threshold values were defined for each provider, namely 1) the mean reimbursements per patient seen for the provider plus one standard deviation, or 2) the mean plus two standard deviations. The means, standard deviations and threshold values are calculated separately for each category of services (within-provider, MVPS, and total).

1.3.4 MEASURING THE STABILITY OF VI

For VI in one period to serve as the basis for a performance standard in a future period, the factors driving VI in a practice need to be sufficiently stable. In this study, the stability of VI is viewed in terms of percentage changes from one year to the next, net of factors such as inflation that may affect all providers in the aggregate. Stability is measured as the percentage difference in actual versus expected VI, where the expected VI is based on observed VI in the prior year.

For any year, the performance standard in the current year is equal to the VI summary measure for the provider last year, times the observed average increase in VI between last year and the coming year for all relevant providers. In actual practice, the trend factor would be based on an estimate of projected average increases between last year and the coming year, or on an

allowable rate of increase. This estimate would involve input from the Health Care Financing Administration's Office of the Actuary, as in the current MVPS.[8]

Differences between the actual and target VI rates for providers constitute a lack of relative constancy. This difference or error for each provider is expressed as a percentage of the estimated VI for the provider. The mean absolute percentage error (MAPE) across all relevant providers is the summary measure of the stability or relative changes in VI from one year to the next. As such, deviation in either direction from the standard (i.e., targets that either overestimated or underestimated actual VI) are treated the same in the stability measure. In contrast, reward systems under actual performance standards clearly would favor changes in reimbursement rates that were below average (i.e., negative). In that context, reasonable stability in relevant uncontrollable factors would be a necessary precondition, and favorable performance would be attributable to efforts to practice efficiently.

1.3.5 EXPLAINING RELATIVE STABILITY AMONG PROVIDERS

The percentage error, i.e., the difference between actual and target reimbursements per unique patient seen, will differ among providers in the sample. Moreover, for a given provider the percentage error may very well be different depending on the scope of services included in the VI measure. The data include many variables that describe each provider and average characteristics of beneficiaries seen. Providers with relatively small percentage errors are compared to those with relatively large errors in terms of each of these characteristics, in order to explore potential systematic determinants of the magnitude of error. Comparisons between providers are made three times: using all Medicare, MVPS and within-provider services.

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[8]Presumably because of missing bills, some reimbursement rates in this analysis are lower in 1990 than in 1989.

One potentially important characteristic is provider type, which can be either solo, single specialty group or multispecialty group (officially "clinic"). In the study sample, the provider types are represented in approximately equal proportions although in the population solos greatly outnumber groups, and single specialty groups outnumber clinics.

Certain characteristics of beneficiaries seen are averaged at the provider level for the year 1989. For example, the mean age of beneficiaries seen, and the percentage who are entitled to Medicare because of disability are calculated for each provider. Also calculated for each provider are the fraction of beneficiaries seen who died sometime during calendar year 1989, and the fraction of the provider's Medicare reimbursements that were for beneficiaries who died. Hospital utilization rates for 1989 were also included. For each provider the proportion of beneficiaries seen who were hospitalized in 1989, and the average number of hospital days, were calculated.

Diagnostic cost groups (DCGs) were used to classify patients seen according to relative expected expenditure rates (Ellis and Ash, 1988). Principal diagnoses from general hospital admissions in the prior year (1988) were used to classify beneficiaries in terms of expected Medicare costs next year into one of the eight DCG categories (coded 0 through 7). All hospital discharges during 1988 are considered, and beneficiaries are classified into the highest DCG category indicated by all principal diagnoses. The average DCG score for beneficiaries seen was calculated for each provider, using hospital discharges that occurred during the prior year.

In addition to the measures described above for beneficiaries seen by each provider during 1989, percentage changes in their values between 1989 and 1990 were calculated to explore the effects of changes across years. For example, along with mean hospital days in 1989 per patient, the percentage change in average hospital days from 1989 to 1990 for each provider is also included. Corresponding changes were measured for each of the patient population descriptors.

1.4 FINDINGS

1.4.1 DESCRIPTION OF BENEFICIARY SAMPLE

This section describes the beneficiaries who were seen by the 122 sample providers during the years 1989, and/or 1990 and who met the other criteria for inclusion in the sample. About three percent of beneficiaries seen in any year did not have positive Medicare reimbursements to the provider, probably because they had not met their Part B deductible. They were not included in the study sample. Over ninety-percent of the beneficiaries seen were 65 years or older. The remainder include beneficiaries entitled to Medicare through permanent disability, and beneficiaries' dependents.

To be included in the sample, beneficiaries must have been seen by one of the sample physician practices, and hence were "users" of services. Thus, utilization and mortality rates for the sample were higher than would be expected for a random sample of Medicare enrollees.

Table 1 shows selected characteristics and utilization rates for beneficiaries included in the sample. The mean age of beneficiaries seen in 1989 was 75.1 years, somewhat higher than the Medicare average of 73.5 years. About 62 percent of beneficiaries were female (compared to about 60 percent of Medicare enrollees), and about 90 percent were white (versus about 87 percent of Medicare beneficiaries). Of the patients seen in 1989, 9.3 percent died sometime during that year; of patients seen in 1990, 8.7 percent died sometime during that year. Understandably, this is higher than the 4.6-percent average for all Medicare enrollees.

Almost 36 percent of the sample were hospitalized during 1989, and approximately 34 percent were hospitalized during 1990. For all Medicare enrollees, an average of about 31.5 percent were hospitalized during those years. Hospital episodes per patient seen averaged about 0.6 for both of the years. Over 60 percent of the beneficiaries received some care in outpatient facilities. During 1990, 58 percent of all Medicare enrollees used outpatient facilities. The mean number of SNF episodes was 0.05 each year, but the mean

number of SNF days was somewhat lower in 1990 (1.9 days) than in 1989 (2.7 days). Each year about 12 percent received home health care services, but the average number of visits was somewhat higher in 1990 (3.4 versus 2.6 days). During 1990, 5.8 percent of all Medicare enrollees used home health services.

Table 2 presents Medicare reimbursements by category of service. Reimbursements for hospital services accounted for the majority of total reimbursements in each year. The second largest category of reimbursements each year was for physician services, accounting for about 28 percent of Medicare reimbursements. All other service categories accounted for single-digit percentages of Medicare reimbursements each year. The categories of physician and supplier reimbursements together comprise approximately the same services that are included in the MVPS and account for about one-third of Medicare reimbursements.

There were declines in reimbursement rates in many categories of service. This could be attributable to a larger proportion of missing bills in 1990. However, there was a relatively small overlap in patient populations over the two years, and the average age of beneficiaries in 1990 is lower by approximately one year of age.

1.4.2 DESCRIPTION OF PROVIDER SAMPLE

Table 3 shows the composition of the provider sample in terms of provider type and carrier region. The largest number of sample providers were in Pennsylvania (47 percent), and the smallest number were in Massachusetts (7 percent). Of the five carrier regions, Pennsylvania had the largest proportion of multispecialty groups, which led to correspondingly higher sampling rates from that state for the solo and single specialty practices. Thirty-one percent of the sample were solo practices, 30 percent were multispecialty practices, and 39 percent were single specialty practices.

Providers had a mean of 436 beneficiaries with positive reimbursements in 1989 (with a range of 5 to 4,968), and a mean of 452 beneficiaries in 1990

(with a range of 7 to 5,428). Table 4 shows that the providers in the sample also had very different average reimbursements per unique patient seen for each type of service category. The wide ranges in provider mean values of total Medicare reimbursements ($2,212 to $19,775 in 1989) and MVPS reimbursements ($740 to $6,299 in 1989) indicate that the case mixes differed substantially among these providers. The distributions for within-provider mean reimbursement rates were wider still, in relative terms ($46 to $3,186 in 1989).

Table 4 shows that sample providers' patients averaged $7096 in total Medicare reimbursements in 1989, and $6732 (5.1 percent lower) in 1990. The lower average in 1990 likely reflected a larger proportion of missing bills in the MADRS file for that time period. Values of RPUPS for MVPS services in 1989 and 1990 were $2275 and $2243 (1.4% lower), respectively. The sample mean value of RPUPS was $422 in 1989 and $387 (8.3% lower) in 1990. These values were approximately six percent of total Medicare reimbursements and 17 to 19 percent of mean reimbursements for MVPS services.

1.4.3 RELATIVE CONSTANCY OVER CONSECUTIVE YEARS

The tendencies for RPUPS at the provider level to remain constant over time were measured using the mean absolute percentage error (MAPE). Table 5 shows alternative MAPE values for RPUPS based on all Medicare, MVPS, and within-provider reimbursements. Without any high or low cost thresholds used in RPUPS, the MAPE was 16.6 percent for all Medicare services, and an almost identical 16.7 percent for within-provider services. For MVPS services the MAPE value was 10.9 percent, about a third less than the MAPE values for the other categories of service.

Surprisingly, imposing high and low cost thresholds generally increased the average differences between actual and expected RPUPS values. In part, this may be the result of the reductions in beneficiary population sizes brought about by the low cost thresholds. The only instances in which the

cut-offs improved the MAPE values were with the low cost thresholds based on absolute dollar amounts ($50, $100 and $200) for within-provider services, with the one-standard deviation threshold for high cost outliers.

The provider level components of the MAPE (i.e., the percentage error observed for each provider) for all three service categories ranged widely, from near zero to almost two (for RPUPS without outlier thresholds). Table 6 presents the provider level distribution of percentage errors in RPUPS for the three service categories. Generally the median provider was rather well below the mean value. Values below 10 percent in 1989-1990 were found for almost half (48.4 percent) of providers based on all Medicare services, almost two-thirds (66.4 percent) of providers based on MVPS services, and again almost half (47.5 percent) of providers based on within-provider services.[9]

1.4.4 FACTORS ASSOCIATED WITH THE SIZE OF ERROR

The preceding analysis showed that the percentage error at the provider level ranged widely, but that a large fraction of providers had single-digit percentage errors. This section presents findings regarding factors that may be systematically associated with high or low percentage errors at the provider level. Results are presented first for VI rates based on all Medicare services, followed by MVPS services and within-provider services.

It may be useful first to point out the relationships among MAPEs based on all Medicare, MVPS and within-provider services. See Exhibit 1. The within-provider service category is a subset of MVPS, which is a subset of all Medicare. Percentage errors at the provider level for MVPS and all Medicare services correlate quite substantially (Pearson R = 0.74). However, percentage errors for within-provider services do not correlate significantly

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[9]Frequency distributions by provider were also calculated that distinguished between positive and negative errors, to explore whether reductions between the years due to missing bills were concentrated among a few providers. This would tend to lower the expected values for all providers and worsen the MAPE values. For all three service categories, over 40 percent of providers had negative changes in reimbursements per unique patient seen, suggesting that missing bills were broadly distributed across providers.

with percentage errors based on either all Medicare services (R = -0.10) or MVPS services (R = -0.02). This finding suggests that the conditions or circumstances connected with relative instability may be quite different depending on the VI measure.

All Medicare Services

Table 7 shows comparisons of providers divided according to whether their percentage errors are less than 10 percent, or greater than or equal to 10 percent. The first row of the table shows the large difference in mean absolute percentage errors for these two provider groups. The last column shows the statistical significance of the differences between the groups, which is based on the t-test (except for provider type which is based on Chi-square).

Generally, the percentage changes between 1989 and 1990 in the patient characteristics and utilization rates were found to be statistically significant rather than the absolute levels observed in 1989. Providers with larger errors had greater changes in their patients' hospital admission rates (19% versus 9%), and in hospital days per patient (34% versus 13%). These findings seem reasonable because differences in hospital utilization rates would be expected to correlate strongly with differences in total Medicare reimbursement rates.

Providers with larger errors tended to have greater changes in patient characteristics, including changes in the proportion of males (14% versus 7%) and changes in the proportion of disabled (45% versus 30%). Changes in average DCG scores were also higher for the providers with larger errors (27% versus 18%).

MVPS Services

Table 8 shows comparisons of providers with small errors (less than 10 percent) to those with larger errors, based on MVPS services. A larger number of providers were classified as having small errors in the case of MVPS

services than the other service categories. The two groups had mean absolute percentage errors of five percent and 24 percent, respectively.

Providers with relatively large errors saw substantially fewer patients on average in 1989 (211) than other providers (550). The average percentage change in the number of patients seen was significantly greater for providers with larger errors (63% versus 25%). Larger errors were associated with greater changes in the proportion of beneficiaries seen who died (36% versus 21%), and changes in the proportion of males (19% versus 7%).

Hospital utilization rates in 1989 did not differ significantly for the two provider groups. However, changes in utilization rates were correlated with relative size of error: providers with larger errors had greater average percentage changes in hospital admission rates (23% versus 9%), hospital days per patient (44% versus 14%), and health status as measured by DCG score (29% versus 19%).

Within-Provider Services

Table 9 shows the comparisons of provider groups defined as having small errors (less than 10 percent) or larger errors based on within-provider services. The mean absolute percentage errors differed substantially for these groups, being five percent and 27 percent, respectively. Differences in terms of provider type approached statistical significance: providers with small errors tended to be multispecialty groups, and providers with large errors tended to be solo practices.

Providers with smaller errors also saw significantly more Medicare beneficiaries in 1989 (551) than the other providers (331). Those with larger errors had larger proportions of disabled beneficiaries, although the difference was small (7% versus 5%). Providers with smaller errors had patient populations with somewhat lower hospital admission rates (0.37 versus 0.42) and average hospital days of care (7.6 days versus 9.2 days). Perhaps surprisingly, average percentage changes in hospital days per patient were significantly higher for providers with smaller errors (30% versus 18%).

Other changes in patient mix and utilization rates did not seem to distinguish these provider groups.

1.5 DISCUSSION

The approach examined in this study uses the average reimbursement rate for beneficiaries seen by a provider in one year as a reference standard for an expected reimbursement rate in the following year. This study compares alternative measures of group-specific volume and intensity for a calendar year based on Reimbursements Per Unique Patient Seen (RPUPS). Definitions of RPUPS that involve all Medicare services or MVPS services (regardless of provider) are essentially per capita (or more precisely "per user") measures of Medicare reimbursement rates. As such, they may be more amenable to health status risk adjustments based on beneficiary characteristics than RPUPS using only within-provider services, which are more dependent upon the scope of services delivered by the particular provider.

Basing group-specific VI measures on all Medicare services delivered to beneficiaries seen would offer the widest incentives to control expenditure growth. Using all MVPS services shares the advantage of including potential referrals to other providers within the incentives for efficiency. This would allow opt-out groups to share in savings generated by avoiding unnecessary services by other providers. Financial incentives may be sufficiently large by sharing with providers a portion of the total savings generated through efficient service delivery patterns.

Among the three categories of service, comparisons based on MVPS services had the lowest average error or instability, at 10.9 percent. Errors based on all Medicare services and within-provider services were higher, averaging 16.6 percent and 16.7 percent, respectively. For all three categories, attempts to curtail the influence of high and low cost outlier patients generally worsened the apparent stability over time, which was contrary to expectations. An actual or near majority of providers had

percentage errors that were less than or equal to 10 percent. Providers with small errors differed systematically in many cases from providers with large errors. Some potential risk adjusters were correlated with error size, including sex, reason for entitlement and health status based on average DCG score.

Of importance are the apparent shortcomings of the billing number as a unit of observation. In this sample of the largest primary care medical providers in the BMAD sample, no providers saw many more than 5,000 beneficiaries in 1989 or in 1990. This is only a fraction of the number of beneficiaries seen by the largest Medicare providers when viewed as a whole, i.e., when all relevant Medicare Provider ID Numbers are combined. For example, some physician groups have informed us that they serve on the order of 20 thousand to 50 thousand Medicare beneficiaries per year. Some providers identified in the BMAD sample represent parts of larger group practices. It may not be accurate to infer from the present findings what outcomes to expect for the largest multispecialty group practices.

The next steps planned for the research will entail constructing the entire utilization experiences of providers by pooling all relevant billing numbers. For these larger provider entities as well, the relative effectiveness of health status adjusters will be explored. Classification systems based on ambulatory diagnosis will be considered. Additional data will be gathered regarding some of the providers themselves. For example, it may be helpful to take into account the internal revenue sharing agreements among physicians, as well as non-Medicare utilization and reimbursements rates. Working directly with selected providers is part of the ongoing research effort, and is discussed in the second part of this report.

PART 2: ASSESSING THE INTEREST OF SELECTED PHYSICIAN GROUPS

2.1 INTRODUCTION

This part of the study focused on the voluntary aspect of group-specific volume performance standards. That is, group-specific volume performance standards would apply to qualified physician organizations that volunteer to opt out of the national MVPS. Medicare could benefit if the separate volume performance standards caused volunteering groups to become more efficient and/or more efficient practices to expand their share of Medicare beneficiaries served.

One objective of the past year's research activities was to gauge the interest that large physician group practices might have in practice level volume performance standards. The question relates to their interest in the fundamental concept as well as particular model features. For example, the set of services to be included in the volume measure and standard may be varied. Other features to consider include the handling of high or low cost outliers, case-mix adjusters, and the nature of risk sharing. If significantly greater provider interest exists under specific designs, those preferences could be taken into account in determining the final design.

Meetings were held with representatives of physician group practices, both individually and in group settings. During the meetings, researchers set the question of whether to participate in the context of the current MVPS and continuing Medicare physician payment reform.

2.2 GROUP PRACTICES VISITED

A limited number of large multispecialty practices were selected to be interviewed. The practices varied in terms of specialty composition, whether or not they were hospital-based and the proportion of patients served under prospective payment contracts.

For convenience and economy, it was decided to first visit practices in Massachusetts. Contact was made with practices in other parts of the country as well, in many cases due to provider interest generated by a previous research report (Wallack et al., 1991). On two occasions, researchers from the Institute for Health Policy were invited to meet with group practice representatives participating in national conferences. These opportunities led to contact with several group practices. Meetings were held with senior level management, including chief financial officers and senior medical staff.

2.3 CONTENT OF DISCUSSIONS WITH GROUP PRACTICE REPRESENTATIVES

Generally, meetings were used to cover four topics: background for the study; goals of the current study; determination of attractive program elements; and selection criteria for voluntary opt out groups.

Background for the Study. The background discussion was used to assure that participants in the meetings were familiar with:

1. The MVPS program,
2. Current research efforts looking at ways to improve MVPS, including voluntary physician opt-out groups; and
3. The previous Brandeis study that identified practice and patient payment models.

Goals of the Current Study. Discussion of the current study included an exposition of potential volume and intensity measures and related empirical work underway. The other goals of the current study, including assessing the level of provider interest and developing eligibility criteria for voluntary opt out arrangements, were also discussed.

Most group practice representatives seemed to be interested in providing further input into the present study, and several are being invited to participate in advisory committees to guide the development of potential

models. Clearly, the high level of support for the opt-out group concept, and the willingness of practices to participate in developing ideas for such a payment program, were pivotal findings. The level of interest was exhibited by a willingness to devote staff time to collaborate with Brandeis in future research tasks.

Determination of Attractive Program Elements. Four categories of program characteristics were presented to assess group practice interest: the scope of services to be included in the target; administration practices and information; how savings could be distributed; and potential adjustments to the volume performance standard.

Regarding the scope of services, consideration was given to the possibility of limiting the volume and intensity measure to services delivered by the provider, including physician or all MVPS services provided by others, or widening the definition beyond the Part B services currently included in the Medicare MVPS to include inpatient care.

Perhaps not surprisingly, those groups that operated their own hospitals were more interested in the possibility of including Part A services. There was some interest in the within-provider payment model, i.e., in which only reimbursements for the group are included in the volume and intensity measure. Interest in patient management models, i.e., those with broader service categories, seemed to be roughly proportional to the involvement of the group in full capitation contracts. All of the practices were somewhat reluctant to make decisions about particular "models" until more research is conducted and discussed.

Discussed with regard to administrative systems were the timeliness and frequency of payments, and information feedback. Some practices were particularly interested in the possibility of learning more about utilization of Medicare services outside their own group. Presently, practices have no way of knowing levels of "out of practice" utilization by their patients.

Various ways that savings might accrue to practices that are successful is avoiding unnecessary utilization were briefly discussed:

- o A provider-specific conversion factor
- o Bonus payments to the provider
- o Lower copayments for patients

Until more research is conducted no clear preference exists. Some of the practices seem more interested in providing benefits to patients in order to develop more patient loyalty to the practice. Many of the largest practices see an opportunity to maintain Medicare fees at levels more commensurate with private payers.

While practices seemed somewhat interested in how savings might be distributed, they were more concerned with assuring that they would not be negatively affected by operating under their own volume standards. At this time we need to work with the practices to test alternative case-mix adjusters, and to understand the effects of changes in case mix and practice characteristics on the stability of volume and intensity rates. Very appealing to providers was the possibility of a "hold harmless" provision in a demonstration program. In other words if these practices participate in a demonstration program, they would be assured that they would not incur loses greater than what they would have incurred under the national MVPS.

Selection Criteria for Voluntary Opt Out Groups. The final issue included in the meetings was criteria for qualifying providers to participate in a voluntary program. This issue relates to whether the practices have systems in place to control and monitor utilization and quality of care, i.e. systems for utilization review, quality assurance programs and peer review programs. It was decided that more extensive input was needed to provide systematic background information on the practices participating on the advisory committee.

2.4 SUMMARY OF FINDINGS

The most important finding was that large group practices would like to consider operating under their own volume performance standard. They would like to have the opportunity to think about how they might control their efficiency and not be subjected to penalties resulting from the outcomes of national aggregate physician utilization. Briefly summarized, the findings include:

- Large multispecialty group practices want an opportunity to demonstrate they are the "best of the breed".

- While some providers are willing to consider joining in a demonstration in which a lot of learning would take place by all parties, the group practices did not want to be placed at a disadvantage if they participated. Hold harmless provisions in demonstration programs are likely to be beneficial to participation rates.

- Providers were hesitant to respond to preliminary patient management and practice management models. They want to carefully review a series of alternative parameters.

- The strongest conclusion from our first site visits is that significant interest in the voluntary volume performances standards exists, at least among group practices that share revenue and expenditures. The extent of interest among group practices that only share expenses and do not pool practice income has not been explored. Solo and other physicians receiving strict fee-for-service reimbursements may require other organizational arrangements in order to adjust incentives. Existing entities such as IPAs and group or network HMOs could serve this function, or new entities could be formed.

In sum, while only a small number of multispecialty practices have been visited to date, it would appear that there is a high level of interest by physician groups. Familiarity with managed care and capitation could result in widespread participation in a voluntary VPO program if initial demonstrations efforts prove successful. One question that remains is whether any demonstrations should be diversified or only include the large multispecialty groups.

2.5 NEXT STEPS WITH INTERESTED GROUP PRACTICES

An advisory group comprised of about ten medical practices has been established to provide input into development of the payment models that result from this phase of the study. Representatives from the group practices will critique the proposals. A limited number of them will participate in an assessment of how their practices would be affected and how they might respond to the payment model selected. While participation of these practices is indicative of their strong interest in the concept and potential types of practice level volume performance standards, there is no commitment on their part to participate in any future demonstration.

The advisory group will probably only meet together once in the next year to discuss the likely effects in the test sites. All the participating practices will be asked to complete a response sheet describing their financial operations, the size and structure of the practice, utilization rates and management systems that monitor individual physician and group performances. This information will be used in the research to help develop recommended eligibility criteria for possible demonstrations or options under Medicare. There is no guarantee that any or all of the providers currently participating in the research will qualify for practice level volume performance standards, or that eligibility criteria would be limited to characteristics of the providers actively giving input to the research at this stage.

PART 3: CONCLUSIONS

Medicare and Health Care System Reforms

Medicare physician payment reforms have been underway for years now, and major reforms of the entire health care system may begin to occur in the near future. To achieve Medicare-specific or system-wide cost savings, reform strategies must deal with both pricing and the volume of services. Many approaches are under consideration for system-wide reforms, including further price regulation, global health care budgets, managed competition, etc. To control volume and intensity while maintaining or improving quality, arguably physicians must be given appropriate incentives and sufficient flexibility. Physician practice patterns will need to change, which will require innovation, evaluation and appropriate rewards.

Group-specific volume performance standards could help establish a framework for encouraging and monitoring innovations in practice patterns, without immediately abandoning the existing fee-for-service reimbursement system. The orientation is that of recognizing and cultivating "best practices" rather than using "average practices" as the benchmark for regulations and performance standards. Many of the physician practices that are contributing to this research, most of which are multispecialty group practices with salaried physicians, seem willing to step forward and lend expert direction to the clinical and managerial goals of reform. Furthermore, subjecting the more efficient practices to separate monitoring would allow the use of other regulatory approaches to control the volume and intensity and services delivered by other providers.

There is little question that enrolling of beneficiaries into organized delivery systems would strengthen providers' ability to control service costs. However, enrollment models have met with limited appeal to Medicare beneficiaries thus far. Freedom to choose providers is a valued aspect of the Medicare program. Some observers believe that general willingness to enroll will increase over time as current HMO and PPO members reach retirement age.

Increasing the penetration of enrolled plans into the Medicare market makes sense as a medium to long term strategy. However, for the foreseeable future it seems that the fee-for-service system will be the dominant form of physician payments under Medicare.

As policymakers consider how Medicare might fit into national health care reforms, group-specific volume performance standards could serve as a useful bridge. Large multispecialty group practices are becoming larger and more numerous, and will likely continue to increase in importance as more capitated delivery systems are established. All the while, these providers will be delivering services to Medicare beneficiaries in large numbers. Through performance standards, their evolving systems for generating efficiency can be applied to Medicare patients. Two advantages exist here over capitating providers for Medicare services : 1) Cost savings from reduced hospital utilization would return to Medicare, and 2) The loss potential associated with inaccurate pricing is avoided.

Unfortunately, the fee-for-service system has the weakest incentives for cost control. On the other hand, favorable selection and underservice are not among the weaknesses of the system when compared to typical enrollment models. Often, selection is an effective strategy for competitive health plans because it bolsters the financial bottom line. Premiums or revenues do not decrease to a degree that is commensurate with reductions in expected costs per member that can result from "cream skimming." Under fee-for-service, choosing to not care for patients who have third party coverage for needed services would be tantamount to forgoing revenues and diminishing the financial bottom line. Access to needed services may not be jeopardized under such arrangements, at least compared to two likely alternatives: capitation, and fee penalties and/or further regulation under national or state level Medicare standards or caps.

Group-specific volume performance standards could help to construct a collaborative and constructive framework for understanding, monitoring and ultimately controlling expenditure growth. Beginning with appropriate but

mild incentives to control volume and intensity, this framework could be used to establish gatekeeper or point-of-service models, in which physicians make conscious decisions regarding the appropriateness of specialty and institutional care in light of volume and intensity standards. Similar approaches have been undertaken in the private sector.

Setting Volume Performance Standards

An approach not examined in this study would be to establish volume performance standards based on the average reimbursements rates of other providers rather than historical average reimbursement rates for the particular provider. A main appeal of such an approach would be to directly compare the efficiency of providers, and presumably reward relative efficiency. Although worthy of further study, there are three advantages to using baseline rates plus an allowable rate of growth. First, it may be more desirable to focus on reducing long-term rates of growth than on relative efficiency during a particular time interval. Second, adjusting standards for case-mix differences across providers is assumed to be more problematic than tracking changes in case mix for large and stable group practices. Third, the current MVPS measures rates of growth from a baseline level; evaluating national aggregate performance may be more straightforward if there are parallel designs for opt-out groups and residual providers.

Group-specific volume performance standards follow the principle of experience rating or basing expectations on the historical experience of a delivery system or population. When experience rating is used in the context of competition based on enrollment premiums, it can lead to problems of adverse selection and possibly underservice. However, the models being presented and studied in this report focus on the rate of growth in volume and intensity, and not on direct comparisons of one provider versus another in terms of volume levels per patient. To favorably select under such a model (i.e., to eschew patients in need of services) would mean necessarily to forgo revenues in the current period and to erode the historical base of average

volume and intensity rates which will serve as the providers' baseline for future standards.

The physician practices contacted in this study seemed to understand and appreciate that difference. One interest of theirs is to separate themselves from other providers for the purpose of exhibiting their abilities to provide high quality care efficiently. They do not want to damage their own reputations or to jeopardize the confidence of their patients, who after all are entitled to "vote with their feet" and seek care elsewhere. Many physician practices see an opportunity through group-specific volume performance standards to provide the necessary leadership from the physician community to manage the rate of increase in volume and intensity.

The exact form of the volume measures and standards is not yet determined. In a non-enrolled context, physicians exert actual control only over services they provide or supervise. Beneficiaries are entitled to seek care in other settings and from other physicians. As a result, providers may perceive volume performance standards that include services provided elsewhere as risky and inapplicable. However, adding other physician services or even Part A and other Part B services to the volume measure could greatly increase opportunities for physicians, acting as advisors, to foster efficiency in patient utilization patterns. Although apprehension is understandable, there are other factors to consider. First, the volume performance standard constitutes a target, not a cap on payments. Second, beneficiaries' tendencies to use other providers is implicit in the baseline volume and intensity measure, which serves as the basis for the relevant target. Third, physicians may be able to exert influence, albeit not control, over the utilization patterns of patients. Presumably, patients' respect for the advice of their primary care physicians is a prerequisite for continuity of care and high patient satisfaction. This could result in a tendency for patients to lessen their use of other providers. Fourth, some utilization of other providers, such as second or third opinions, is often warranted and can serve to reduce the frequency of unnecessary services.

Arguably, basing volume performance standards on measures that include services regardless of who provided them, rather than only within-provider services, would offer a more straightforward translation of savings at the practice level to savings to Medicare in the aggregate. Moreover, more inclusive measures are already accepted in capitated delivery systems with member enrollment. Practice level standards could offer a step in the direction of expanded capitation programs under Medicare and other approaches to managed competition. Standards based on within-provider services could be used as a step toward more elaborate models for controlling utilization that depend on setting budgets for providers. This is a general approach often taken in other countries. Since many group practices in this country already pay salaries to physicians, taking the budgeting approach up to the organizational or firm level could be an attractive option that might be implemented through group-specific volume performance standards.

The empirical analysis suggests that, on average, the reliability of a practice level target may differ depending on the categories of service. The category of MVPS services had the lowest average error, at about 11 percent. Total Medicare and within-provider services averaged under 17 percent. The fact that these figures are based on Medicare Provider ID numbers, rather than the entire Medicare experience of complete physician practices, makes it difficult to generalize these findings to actual likely opt-out groups. Presumably, projection errors in the range of five to ten percent would be acceptable, as long as they were "random" and averaged near zero over time. Evidence furnished to us from one of the large group practices showed their annual Medicare reimbursement rates per beneficiary fluctuating by five-percent or less each year. Moreover, empirical evidence from an earlier report showed that an average error of five-percent was attainable for practices seeing at least approximately 1,400 beneficiaries per year (using within-provider reimbursements) (Wallack et al., 1991).

With current data available to Medicare, adjustments to the standard for a practice that are based on patients served may be more realistic than

adjustments for internal or market area changes relevant to a particular provider. Indeed, evidence was found that risk adjusters that use sex, reason for entitlement, diagnostic data, etc. may significantly enhance the validity of a volume standard by taking into account differences from year to year in a provider's patient mix.

Next Steps

Thus far in the research, the empirical analysis of group-specific volume performance standards has been based on provider samples taken from HCFA's BMAD 5-percent sample of Medicare Provider ID numbers. Large physician group practices often use multiple Provider ID numbers. Therefore, the empirical results do not reflect the entire scope of services provided by large, multispecialty group practices. The next phase of the research will involve data referring to the actual group practices that are collaborating in the study, together with providers selected for comparison purposes. Moreover, more refined methods will be employed for adjusting volume performance standards to take account of health status differences in patients seen across years, such as ambulatory diagnoses and/or procedures.

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Table 1: Characteristics of Beneficiaries Seen

	1989 (N=55,307)	1990 (N=56,015)
Mean Age	75.1	74.1
Female	62.0 %	62.2 %
White	90.2 %	89.5 %
Died	9.3 %	8.7 %
Used inpatient hospital	35.9 %	34.1 %
Mean hospital episodes	0.61	0.59
Used outpatient facility	63.4 %	62.2 %
Mean SNF episodes	0.05	0.05
Mean SNF days	2.7	1.9
Used home health	12.4 %	12.2 %
Mean home health visits	2.6	3.4

Source: MADRS

Table 2: Medicare Reimbursement Rates for Beneficiary Samples

	1989 (N=55,307)	1990 (N=56,015)
Hospital	$ 3410 (55%)	$ 3171 (54%)
Outpatient	373 (6%)	377 (6%)
SNF	253 (4%)	176 (3%)
Home Health	156 (3%)	209 (4%)
Hospice	9 (<1%)	10 (<1%)
Physicians	1671 (27%)	1636 (28%)
Suppliers	284 (5%)	286 (5%)
Total Medicare	**$ 6156 (100%)**	**$ 5865 (100%)**

Source: MADRS

Table 3: Provider Sample: Provider Type by Carrier Region

N
total %
row %
col %

	Calif BS	Mass	N Jersey	Penn	Calif Oc	TOTAL
Solo	2	3	5	18	10	38
	1.64	2.46	4.10	14.75	8.20	31.15
	5.26	7.89	13.16	47.37	26.32	
	20.00	33.33	41.67	31.58	29.41	
Multi-Specialty Group	3	2	3	17	11	36
	2.46	1.64	2.46	13.93	9.02	29.51
	8.33	5.56	8.33	47.22	30.56	
	30.00	22.22	25.00	29.82	32.35	
Single Specialty Group	5	4	4	22	13	48
	4.10	3.28	3.28	18.03	10.66	39.34
	10.42	8.33	8.33	45.83	27.08	
	50.00	44.44	33.33	38.60	38.24	
TOTAL	10	9	12	57	34	122
	8.20	7.38	9.84	46.72	27.87	100.00

Sources: BMAD Provider file and MPIES

Table 4: Provider Summaries of Reimbursements Per Unique Patient Seen (N = 122)

1989

Category of Services	MEAN VALUE	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TOTAL MEDICARE	7096.12	3903.14	2211.63	19774.91
MVPS SERVICES	2275.30	1108.60	739.59	6298.50
WITHIN-PROVIDER	421.93	366.54	45.77	3185.80

1990

Category of Services	MEAN VALUE	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
TOTAL MEDICARE	6732.39	3293.99	2304.11	22773.18
MVPS SERVICES	2242.83	1143.53	668.48	9494.68
WITHIN-PROVIDER	387.12	249.66	43.85	1403.50

(Mean number of beneficiaries seen was 436 in 1989, and 452 in 1990)

Table 5: Mean Absolute Percentage Errors
(N = 122)

	All Medicare Services				MVPS Services				Within-Provider Services			
CUT-OFFS[1] (HIGH/LOW)	MEAN	STAND DEV	MIN VALUE	MAX VALUE	MEAN	STAND DEV	MIN VALUE	MAX VALUE	MEAN	STAND DEV	MIN VALUE	MAX VALUE
NONE	**16.6**	**19.9**	**0.0**	**132.7**	**10.9**	**12.6**	**0.1**	**70.5**	**16.7**	**17.3**	**0.0**	**98.7**
1 sd / 0.1	18.1	24.6	0.0	218.6	15.4	19.6	0.0	165.8	18.3	18.1	0.1	111.5
1 sd / 0.25	18.7	27.0	0.5	260.9	15.2	19.8	0.0	164.6	20.2	21.4	0.1	142.8
1 sd / $50	17.8	25.2	0.7	226.2	16.0	20.7	0.1	164.3	15.4	14.5	0.1	74.1
1 sd / $100	19.1	30.7	0.0	280.6	17.0	20.7	0.2	160.9	15.7	20.4	0.0	156.6
1 sd / $200	21.7	49.2	0.1	508.0	21.2	29.9	0.2	212.0	15.5	15.6	0.3	084.3
2 sd / 0.1	18.0	23.0	0.1	192.2	17.5	20.3	0.0	168.1	22.8	24.4	1.4	188.6
2 sd / 0.25	18.7	25.0	0.2	230.8	17.7	20.7	0.6	167.6	24.2	28.6	0.1	233.5
2 sd / $50	17.8	23.4	0.4	199.8	18.6	21.3	0.6	166.7	19.9	20.3	0.3	136.7
2 sd / $100	19.9	32.2	0.1	264.7	19.7	21.7	0.1	163.8	19.4	22.9	0.1	166.4
2 sd / $200	23.8	64.3	0.2	694.3	25.9	42.2	0.0	387.1	19.1	21.3	0.1	151.2

[1] High cut-offs are defined in terms of standard deviations (sd) above the mean. Low cut-offs are defined in terms of reimbursements to the provider: 10 percent of the provider mean (0.1); 25 percent of the provider mean (0.25); or absolute dollar amounts to the provider ($50, $100, $200).

Source: MADRS, BMAD

Table 6: Frequency Distributions of Percentage Errors in Reimbursements Per Unique Patient Seen

SERVICE CATEGORIES

PCT ERROR	TOTAL FREQ	TOTAL PERCENT	TOTAL CUM FREQ	TOTAL CUM PCT	MVPS FREQ	MVPS PERCENT	MVPS CUM FREQ	MVPS CUM PCT	WITHIN-PROVIDER FREQ	WITHIN-PROVIDER PERCENT	WITHIN-PROVIDER CUM FREQ	WITHIN-PROVIDER CUM PCT
0 - 2.5	23	18.9	23	18.9	28	23.0	28	23.0	15	12.3	15	12.3
>2.5 - 5	9	7.4	32	26.2	19	15.6	47	38.5	11	9.0	26	21.3
>5 - 7.5	12	9.8	44	36.1	14	11.5	61	50.0	10	8.2	36	29.5
>7.5 10	**15**	**12.3**	**59**	**48.4**	**20**	**16.4**	**81**	**66.4**	**22**	**18.0**	**58**	**47.5**
>10 - 15	15	12.3	74	60.7	13	10.7	94	77.0	16	13.1	74	60.7
>15 - 20	16	13.1	90	73.8	12	9.8	106	86.9	12	9.8	86	70.5
>20 - 30	15	12.3	105	86.1	4	3.3	110	90.2	20	16.4	106	86.9
>30 - 40	7	5.7	112	91.8	7	5.7	117	95.9	7	5.7	113	92.6
>40 - 50	1	0.8	113	92.6	2	1.6	119	97.5	3	2.5	116	95.1
>50 - 75	7	5.7	120	98.4	3	2.5	122	100.0	3	2.5	119	97.5
>75 - 100									3	2.5	122	100.0
>100	2	1.6	122	100.0								

Source: MADRS, BMAD (1989-1990)

Table 7: Comparisons of Providers with Large and Small Percentage Errors (Total Medicare RPUPS)

	Providers		
	Small Errors (n = 59)	Large Errors (n = 63)	Significance
MAPE	0.05	0.28	
Provider type			0.39
-Solo provider	25%	37%	
-Single specialty group	44%	35%	
-Multispecialty group	31%	29%	
Number of patients	491	384	0.35
-% change	30	44	0.21
Proportion decedents	10.5%	11.4%	0.56
-% change	24	28	0.49
Reimbursements for decedents (%)	14.6	14.8	0.92
-% change	54	53	0.90
Proportion male	38%	37%	0.53
-% change	7	14	0.03
Proportion disabled	7%	5%	0.13
-% change	30	45	0.05
Age	74.7	75.4	0.10
-% change	1.3	1.6	0.14
DCG score	0.53	0.51	0.65
-% change	18	27	0.02
Hospital admission rate	0.41	0.38	0.29
-% change	9	19	0.003
Hospital days	8.7	8.2	0.62
-% change	13	34	0.001

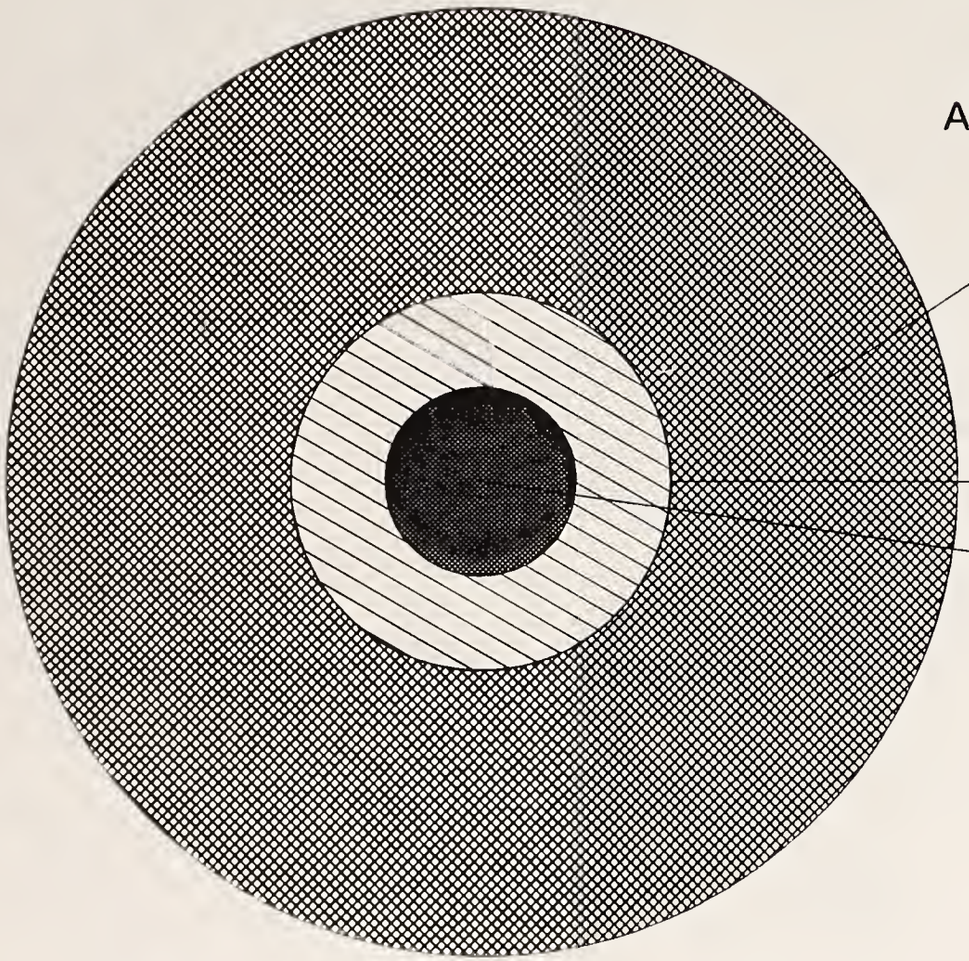
Table 8: Comparisons of Providers with Large and Small Percentage Errors (MVPS RPUPS)

	Providers		
	Small Errors (n = 81)	Large Errors (n = 41)	Significance
MAPE	0.05	0.24	
Provider type			0.23
-Solo provider	27%	39%	
-Single specialty group	44%	29%	
-Multispecialty group	28%	32%	
Number of patients	550	211	0.0002
-% change	25	63	0.01
Proportion decedents	11.2%	10.6%	0.75
-% change	21	36	0.02
Reimbursements for decedents (%)	15	14	0.36
-% change	50	60	0.43
Proportion male	37.5%	37.2%	0.85
-% change	7	19	0.01
Proportion disabled	6.0%	5.9%	0.95
-% change	35	42	0.40
Age	75.1	75.0	0.90
-% change	1.4	1.7	0.33
DCG score	0.52	0.50	0.65
-% change	19	29	0.04
Hospital admission rate	0.41	0.38	0.50
-% change	9	23	0.005
Hospital days	8.6	8.1	0.59
-% change	14	44	0.002

Table 9: Comparisons of Providers with Large and Small Percentage Errors (Within-Provider RPUPS)

	Providers		
	Small Errors (n = 58)	Large Errors (n = 64)	Significance
MAPE	0.05	0.27	
Provider type			0.11
-Solo provider	24%	38%	
-Single specialty group	38%	41%	
-Multispecialty group	38%	22%	
Number of patients	551	331	0.06
-% change	36	39	0.77
Proportion decedents	10.6%	11.4%	0.59
-% change	25	27	0.57
Reimbursements for decedents (%)	15	15	0.89
-% change	45	61	0.18
Proportion male	37%	37%	0.92
-% change	10.9	10.7	0.95
Proportion disabled	5%	7%	0.09
-% change	38	37	0.91
Age	75.3	74.8	0.20
-% change	1.5	1.4	0.63
DCG score	0.51	0.53	0.68
-% change	21	24	0.34
Hospital admission rate	0.37	0.42	0.07
-% change	15	13	0.77
Hospital days	7.6	9.2	0.09
-% change	30	18	0.10

EXHIBIT 1
Relationship of Three Models to Each Other and To Services Covered



NOTES:

All Medicare Services include all Medicare Health Insurance and Supplementary Insurance Services paid for a beneficiary receiving "any" service by the practice

MVPS include all services under MVPS paid for a beneficiary receiving any service from the practice. Excludes Part A and selected Part B Services.

Within-Provider services includes only Part B services provided by the Practice to beneficiaries served.